

ADDENDUM NO. TWO

AB2013-23

Notice is hereby given that on July 25, 2013 at 11:00 A.M., sealed proposals will be opened and read in public by the Purchasing Agent in the Mercer County McDade Administration Building, 640 South Broad Street, Room 321, Trenton, New Jersey for:

**NEW PLAZA AND SITE IMPROVEMENTS
AT THE ICE SKATING RINK
AT THE FESTIVAL GROUNDS AT MERCER COUNTY PARK
PAXSON AVENUE AND SOUTH POST ROAD
WEST WINDSOR, NEW JERSEY 08550
FOR THE MERCER COUNTY PARK COMMISSION
AB2013-23**

Clarifications, amendments, additions, deletions, revisions and modifications are part of the Contract and change the original documents only in the manner and to the extent stated.

Respondents shall complete the Acknowledgement of Receipt of Addendum No. 2 and shall include the Acknowledgement with their response.

"BIDDERS SHALL ADD THE ATTACHED SPECIFICATION 328400 "PLANTING IRRIGATION" INTO THE PROJECT MANUAL. PRODUCTS SHALL BE BRAND REFERENCED OR AN EQUIVALENT."

Specifications and instructions may be obtained by contacting the Department of Purchasing at 609 989 6710 or on the Mercer County Website at:

<http://nj.gov/counties/mercer/procurement/bidsopp.html>

It is the responsibility of prospective respondent's to check this website for any addenda issued prior to the proposal opening. Failure to do so could result in the rejection of your submission.

Respondents are required to comply with the requirements of N.J.S.A.10:5-31 et seq. and N.J.A.C. 17:27.

Marcella Covello, QPA
Purchasing Agent
County of Mercer
609 989 6710
AB2013-23

COUNTY OF MERCER
ACKNOWLEDGEMENT OF RECEIPT OF ADDENDA

The undersigned Respondent hereby acknowledges receipt of the following Addenda:

Addenda Number

Dated

_____ 2 _____

Signed: _____

Title: _____

Printed Name: _____

Date: _____

Company: _____

ADDENDUM #2

**NEW PLAZA AND SITE IMPROVEMENTS AT THE
ICE SKATING RINK AT THE**

**FESTIVAL GROUNDS AT
MERCER COUNTY PARK**

**PAXSON AVENUE AND SOUTH POST ROAD
WEST WINDSOR, NEW JERSEY**

FOR THE

MERCER COUNTY PARK COMMISSION

County Purchasing Department Number: AB2013-23
Architect's Commission Number: 12M022

RELEASED FOR BID: June 12, 2013

ADDENDUM #1 DATE: June 26, 2013

ADDENDUM #2 DATE: July 9, 2013

SPIEZLE ARCHITECTURAL GROUP, INC.





ADDENDUM #2

Architect of Record:

SPIEZLE ARCHITECTURAL GROUP, INC.
120 SANHICAN DRIVE
TRENTON, NEW JERSEY 08618

Project:

**NEW PLAZA AND SITE IMPROVEMENTS AT THE
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PROJECT MANUAL

ITEM NO. PM-2 **SECTION 328400 – PLANTING IRRIGATION**

Add the enclosed Specification 328400 "Planting Irrigation", total of 14 pages, into the project manual.

END OF ADDENDUM NO. 2

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SECTION 328400 - PLANTING IRRIGATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Piping.
2. Manual valves.
3. Automatic control valves.
4. Automatic drain valves.
5. Sprinklers.
6. Quick couplers.
7. Controllers.
8. Boxes for automatic control valves.

1.2 PERFORMANCE REQUIREMENTS

- A. Irrigation zone control shall be automatic operation with controller and automatic control valves.
- B. Delegated Design: Design 100 percent coverage irrigation system, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
1. Test soil conditions of area to be irrigated to ensure adequate design. Testing to determine soil type, particle size, structure, density, moisture content and infiltration rate. Retain paragraph below with one of last two paragraphs above.
- C. Minimum Working Pressures: The following are minimum pressure requirements for piping, valves, and specialties unless otherwise indicated:
1. Irrigation Main Piping: 200 psig.
 2. Circuit Piping: 150 psig.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

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- B. Wiring Diagrams: For power, signal, and control wiring.
- C. Delegated-Design Submittal: For irrigation systems indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.4 INFORMATIONAL SUBMITTALS

- A. Zoning Chart: Show each irrigation zone and its control valve.
- B. Controller Timing Schedule: Indicate timing settings for each automatic controller zone.
- C. Field quality-control reports.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and maintenance data.

1.6 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

PART 2 - PRODUCTS

2.1 PIPES, TUBES, AND FITTINGS

- A. Comply with requirements in the piping schedule for applications of pipe, tube, and fitting materials, and for joining methods for specific services, service locations, and pipe sizes.
- B. Hard Copper Tube: ASTM B 88, Type K water tube, drawn temper.
 - 1. Copper Pressure Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper solder-joint fittings. Furnish wrought-copper fittings if indicated.
 - 2. Bronze Flanges: ASME B16.24, Class 150, with solder-joint end.
 - 3. Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body, with ball-and-socket, metal-to-metal seating surfaces and solder-joint or threaded ends.
- C. PVC Pipe: ASTM D 1785, PVC 1120 compound, Schedule 80.
 - 1. PVC Socket Fittings: ASTM D 2466, Schedule 80.
 - 2. PVC Threaded Fittings: ASTM D 2464, Schedule 80.

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3. PVC Socket Unions: Construction similar to MSS SP-107, except both headpiece and tailpiece shall be PVC with socket ends.

D. PVC Pipe, Pressure Rated: ASTM D 2241, PVC 1120 compound, SDR 21.

1. PVC Socket Fittings: ASTM D 2467, Schedule 80.
2. PVC Socket Unions: Construction similar to MSS SP-107, except both headpiece and tailpiece shall be PVC with socket or threaded ends.

2.2 PIPING JOINING MATERIALS

- A. Pipe-Flange Gasket Materials: AWWA C110, rubber, flat face, 1/8 inch thick unless otherwise indicated; full-face or ring type unless otherwise indicated.
- B. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.
- C. Solvent Cements for Joining PVC Piping: ASTM D 2564. Include primer according to ASTM F 656.
- D. Plastic, Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer unless otherwise indicated.

2.3 MANUAL VALVES

A. Curb Valves:

1. Description:
 - a. Standard: AWWA C800.
 - b. NPS 1 and Smaller Pressure Rating: 150 psig.
 - c. NPS 1-1/4 to NPS 2 Pressure Rating: 150 psig.
 - d. Body Material: Brass or bronze with ball or ground-key plug.
 - e. End Connections: Matching piping.
 - f. Stem: With wide-tee head.

B. Curb-Valve Casing:

1. Standard: Similar to AWWA M44 for cast-iron valve casings.
2. Top Section: Telescoping, of length required for depth of burial of curb valve.
3. Barrel: Approximately 3-inch diameter.
4. Plug: With lettering "WATER."
5. Bottom Section: With base of size to fit over valve.
6. Base Support: Concrete collar.

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- C. Shutoff Rods for Curb-Valve Casings: Furnish one steel, tee-handle shutoff rod(s) with one pointed end, stem of length to operate deepest buried valve, and slotted end matching curb valve for Project.
- D. Bronze Ball Valves:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. American Valve, IncConbraco Industries, Inc.; Apollo Valves.
 - b. Crane Co.; Crane Valve Group; Crane Valves.
 - c. Hammond Valve.
 - d. Milwaukee Valve Company.
 - e. NIBCO INC.
 - f. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
 2. Description:
 - a. Standard: MSS SP-110.
 - b. SWP Rating: 150 psig.
 - c. CWP Rating: 600 psig.
 - d. Body Design: Two piece.
 - e. Body Material: Bronze.
 - f. Ends: Threaded or solder joint if indicated.
 - g. Seats: PTFE or TFE.
 - h. Stem: Bronze.
 - i. Ball: Chrome-plated brass.
 - j. Port: Full.
- E. Plastic Ball Valves:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. American Valve, Inc.
 - b. Asahi/America, Inc.
 - c. IPEX Inc.
 - d. Jomar International, LTD.
 - e. KBI (King Bros. Industries).
 - f. Legend Valve.
 - g. NIBCO INC.
 - h. Sloane, George Fischer, Inc.
 - i. Spears Manufacturing Company.
 - j. Thermoplastic Valves Inc.
 - k. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
 2. Description:

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- a. Standard: MSS SP-122.
- b. Pressure Rating: 150 psig.
- c. Body Material: PVC.
- d. Type: Union.
- e. End Connections: Socket or threaded.
- f. Port: Full.

2.4 AUTOMATIC CONTROL VALVES

A. Plastic, Automatic Control Valves:

- 1. Basis-of-Design Product: Subject to compliance with requirements, provide Irritrol 700 Series or comparable product by one of the following:
 - a. Buckner; a division of Storm Manufacturing Group IncCeres Products Company.
 - b. Champion Irrigation Products.
 - c. Hunter Industries Incorporated.
 - d. Irritrol Systems.
 - e. Olson Irrigation Systems.
 - f. Orbit Irrigation Products, Inc.
 - g. Rain Bird Corporation.
 - h. Superior Controls Co., Inc.
 - i. Toro Company (The); Irrigation Division.
- 2. Description: Molded-plastic body, normally closed, diaphragm type with manual-flow adjustment, and operated by 24-V ac solenoid.

2.5 AUTOMATIC DRAIN VALVES

- ### A. Description: Spring-loaded-ball type of corrosion-resistant construction and designed to open for drainage if line pressure drops below 2-1/2 to 3 psig.

2.6 SPRINKLERS

- ### A. General Requirements: Designed for uniform coverage over entire spray area indicated at available water pressure.
- ### B. Plastic, Pop-up, Gear-Drive Rotary Sprinklers:
- 1. Basis-of-Design Product: Subject to compliance with requirements, provide Toro T7 Series Sprinkler or an engineer approved comparable product by one of the following:
 - a. Buckner; a division of Storm Manufacturing Group Inc.

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- b. Champion Irrigation Products.
 - c. Hunter Industries Incorporated.
 - d. Irritrol Systems.
 - e. K-RAIN Manufacturing Corporation.
 - f. Nelson, L. R. Corporation.
 - g. Rain Bird Corporation.
 - h. Toro Company (The); Irrigation Division.
2. Description:
- a. Body Material: ABS.
 - b. Nozzle: ABS.
 - c. Retraction Spring: Stainless steel.
 - d. Internal Parts: Corrosion resistant.
3. Capacities and Characteristics: Varies, as needed to provide complete sprinkler coverage for area indicated on design drawings.
- C. Plastic, Pop-up, Impact-Drive Rotary Sprinklers:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- a. Buckner; a division of Storm Manufacturing Group Inc.
 - b. Ceres Products Company.
 - c. Champion Irrigation Products.
 - d. Nelson, L. R. Corporation.
 - e. Toro Company (The); Irrigation Division.
2. Description:
- a. Case: ABS.
 - b. Pop-up Height: Approximately 3 inches.
 - c. Sprinkler Construction: ABS and other corrosion-resistant metals.
3. Capacities and Characteristics: Varies, as needed to provide complete sprinkler coverage for area indicated on design drawings.
- D. Plastic, Pop-up Spray Sprinklers:
1. Basis-of-Design Product: Subject to compliance with requirements, provide Toro Pop-Up Spray Sprinklers, Model 800 Series or 570Z-xP Series, or comparable product by one of the following:
- a. Buckner; a division of Storm Manufacturing Group Inc.
 - b. Ceres Products Company.
 - c. Champion Irrigation Products.

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- d. Hunter Industries Incorporated.
 - e. Nelson, L. R. Corporation.
 - f. Orbit Irrigation Products, Inc.
 - g. Rain Bird Corporation.
 - h. Toro Company (The); Irrigation Division.
 - i.
2. Description:
- a. Body Material: ABS.
 - b. Nozzle: ABS.
 - c. Retraction Spring: Stainless steel.
 - d. Internal Parts: Corrosion resistant.
 - e. Pattern: Fixed, with flow adjustment.
3. Capacities and Characteristics: Varies, as needed to provide complete sprinkler coverage for area indicated on design drawings.

E. Plastic Shrub Sprinklers:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Toro Shrub Sprinkler or comparable product by one of the following:
- a. Buckner; a division of Storm Manufacturing Group Inc.
 - b. Ceres Products Company.
 - c. Champion Irrigation Products.
 - d. Dig Corporation.
 - e. Hunter Industries Incorporated.
 - f. Orbit Irrigation Products, Inc.
 - g. Senninger Irrigation, Inc.
 - h. Toro Company (The); Irrigation Division.
2. Description:
- a. Body Material: ABS or other plastic.
 - b. Pattern: Fixed, with flow adjustment.
3. Capacities and Characteristics: Varies, as needed to provide complete sprinkler coverage for area indicated on design drawings.

2.7 QUICK COUPLERS

- A. Description: Factory-fabricated, bronze or brass, two-piece assembly. Include coupler water-seal valve; removable upper body with spring-loaded or weighted, rubber-covered cap; hose swivel with ASME B1.20.7, 3/4-11.5NH threads for garden hose on outlet; and operating key.

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1. Locking-Top Option: Vandal-resistant locking feature. Include one matching key.

2.8 CONTROLLERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Toro Sentinel Series Stainless Steel Pedestal Mount Controller, Part # SSAK48PS16NS4 or an engineer approved comparable product by one of the following:

1. Buckner; a division of Storm Manufacturing Group Inc.
2. Champion Irrigation Products.
3. Hunter Industries Incorporated.
4. Irritrol Systems.
5. Orbit Irrigation Products, Inc.
6. Superior Controls Co., Inc.
7. Toro Company (The); Irrigation Division.

- B. Description:

1. Controller Stations for Automatic Control Valves: Each station is variable from approximately 5 to 60 minutes. Include switch for manual or automatic operation of each station.
2. Exterior Control Enclosures: NEMA 250, Type 4, weatherproof, with locking cover and two matching keys; include provision for grounding.
 - a. Body Material: Stainless-steel sheet metal.
 - b. Mounting: Freestanding type for concrete base.
3. Interior Control Enclosures: NEMA 250, Type 12, dripproof, with locking cover and two matching keys.
 - a. Body Material: Stainless-steel sheet metal.
 - b. Mounting: Surface type for wall.
4. Control Transformer: 24-V secondary, with primary fuse.
5. Timing Device: Adjustable, 24-hour, 14-day clock, with automatic operations to skip operation any day in timer period, to operate every other day, or to operate two or more times daily.
 - a. Manual or Semiautomatic Operation: Allows this mode without disturbing preset automatic operation.
 - b. Nickel-Cadmium Battery and Trickle Charger: Automatically powers timing device during power outages.
 - c. Surge Protection: Metal-oxide-varistor type on each station and primary power.
6. Moisture Sensor: Adjustable from one to seven days, to shut off water flow during rain.

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7. Wiring: UL 493, Type UF multiconductor, with solid-copper conductors; insulated cable; suitable for direct burial.
 - a. Feeder-Circuit Cables: No. 12 AWG minimum, between building and controllers.
 - b. Low-Voltage, Branch-Circuit Cables: No. 14 AWG minimum, between controllers and automatic control valves; color-coded different from feeder-circuit-cable jacket color; with jackets of different colors for multiple-cable installation in same trench.
 - c. Splicing Materials: Manufacturer's packaged kit consisting of insulating, spring-type connector or crimped joint and epoxy resin moisture seal; suitable for direct burial.
8. Concrete Base: Reinforced precast concrete not less than 36 by 24 by 4 inches thick, and 6 inches greater in each direction than overall dimensions of controller. Include opening for wiring.

2.9 BOXES FOR AUTOMATIC CONTROL VALVES

A. Plastic Boxes:

1. Description: Box and cover, with open bottom and openings for piping; designed for installing flush with grade.
 - a. Size: As required for valves and service.
 - b. Shape: Rectangular.
 - c. Sidewall Material: PE, ABS, or FRP.
 - d. Cover Material: PE, ABS, or FRP.
 - 1) Lettering: "IRRIGATION."

- B. Drainage Backfill: Cleaned gravel or crushed stone, graded from 3/4 inch minimum to 3 inches maximum.

PART 3 - EXECUTION

3.1 EARTHWORK

- A. Excavating, trenching, and backfilling are specified in Section 312000 "Earth Moving."
- B. Install warning tape directly above pressure piping, 12 inches below finished grades, except 6 inches below subgrade under pavement and slabs.

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- C. Drain Pockets: Excavate to sizes indicated. Backfill with cleaned gravel or crushed stone, graded from 3/4 to 3 inches, to 12 inches below grade. Cover gravel or crushed stone with sheet of asphalt-saturated felt and backfill remainder with excavated material.
- D. Provide minimum cover over top of underground piping according to the following:
 - 1. Irrigation Main Piping: Minimum depth of 36 inches below finished grade, or not less than 18 inches below average local frost depth, whichever is deeper.
 - 2. Circuit Piping: 12 inches.
 - 3. Drain Piping: 12 inches.
 - 4. Sleeves: 24 inches.

3.2 PIPING INSTALLATION

- A. Location and Arrangement: Drawings indicate location and arrangement of piping systems. Install piping as indicated unless deviations are approved on Coordination Drawings.
- B. Install piping at minimum uniform slope of 0.5 percent down toward drain valves.
- C. Install piping free of sags and bends.
- D. Install groups of pipes parallel to each other, spaced to permit valve servicing.
- E. Install fittings for changes in direction and branch connections.
- F. Install unions adjacent to valves and to final connections to other components with NPS 2 or smaller pipe connection.
- G. Install flanges adjacent to valves and to final connections to other components with NPS 2-1/2 or larger pipe connection.
- H. Install underground thermoplastic piping according to ASTM D 2774 and ASTM F 690.
- I. Lay piping on solid subbase, uniformly sloped without humps or depressions.
- J. Install PVC piping in dry weather when temperature is above 40 deg F. Allow joints to cure at least 24 hours at temperatures above 40 deg F before testing.

3.3 JOINT CONSTRUCTION

- A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

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- C. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
 - 1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
 - 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.
- D. Copper-Tubing Soldered Joints: Apply ASTM B 813 water-flushable flux to tube end unless otherwise indicated. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy (0.20 percent maximum lead content) complying with ASTM B 32.
- E. PVC Piping Solvent-Cemented Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:
 - 1. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements.
 - 2. PVC Pressure Piping: Join schedule number, ASTM D 1785, PVC pipe and PVC socket fittings according to ASTM D 2672. Join other-than-schedule-number PVC pipe and socket fittings according to ASTM D 2855.
 - 3. PVC Nonpressure Piping: Join according to ASTM D 2855.

3.4 VALVE INSTALLATION

- A. Underground Curb Valves: Install in curb-valve casings with tops flush with grade.
- B. Underground Iron Gate Valves, Resilient Seat: Comply with AWWA C600 and AWWA M44. Install in valve casing with top flush with grade.
 - 1. Install valves and PVC pipe with restrained, gasketed joints.
- C. Aboveground Valves: Install as components of connected piping system.
- D. Throttling Valves: Install in underground piping in boxes for automatic control valves.
- E. Drain Valves: Install in underground piping in boxes for automatic control valves.

3.5 SPRINKLER INSTALLATION

- A. Install sprinklers after hydrostatic test is completed.
- B. Install sprinklers at manufacturer's recommended heights.

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- C. Locate part-circle sprinklers to maintain a minimum distance of 4 inches from walls and 2 inches from other boundaries unless otherwise indicated.

3.6 AUTOMATIC IRRIGATION-CONTROL SYSTEM INSTALLATION

- A. Equipment Mounting: Install interior controllers on wall.
 - 1. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 2. Install anchor bolts to elevations required for proper attachment to supported equipment.
- B. Equipment Mounting: Install exterior freestanding controllers on precast concrete bases.
 - 1. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 2. Install anchor bolts to elevations required for proper attachment to supported equipment.
- C. Install control cable in same trench as irrigation piping and at least 2 inches below or beside piping. Provide conductors of size not smaller than recommended by controller manufacturer. Install cable in separate sleeve under paved areas.

3.7 IDENTIFICATION

- A. Identify system components. Comply with requirements for identification specified in Section 220553 "Identification for Plumbing Piping and Equipment."
- B. Equipment Nameplates and Signs: Install engraved plastic-laminate equipment nameplates and signs on each automatic controller.
 - 1. Text: In addition to identifying unit, distinguish between multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations.
- C. Warning Tapes: Arrange for installation of continuous, underground, detectable warning tapes over underground piping during backfilling of trenches. See Section 312000 "Earth Moving" for warning tapes.

3.8 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Tests and Inspections:
 - 1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.

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2. Operational Test: After electrical circuitry has been energized, operate controllers and automatic control valves to confirm proper system operation.
 3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- C. Any irrigation product will be considered defective if it does not pass tests and inspections.
- D. Prepare test and inspection reports.

3.9 ADJUSTING

- A. Adjust settings of controllers.
- B. Adjust automatic control valves to provide flow rate at rated operating pressure required for each sprinkler circuit.
- C. Adjust sprinklers and devices, except those intended to be mounted aboveground, so they will be flush with, or not more than 1/2 inch above, finish grade.

3.10 PIPING SCHEDULE

- A. Install components having pressure rating equal to or greater than system operating pressure.
- B. Piping in control-valve boxes and aboveground may be joined with flanges or unions instead of joints indicated.
- C. Aboveground irrigation main piping, NPS 4 and smaller, shall be the following:
1. Type K hard copper tube, wrought- or cast-copper fittings, and soldered joints.
- D. Underground irrigation main piping, NPS 4 and smaller, shall be the following:
1. SDR 21, PVC, pressure-rated pipe; Schedule 80, PVC socket fittings; and solvent-cemented joints.
- E. Circuit piping, NPS 2 and smaller, shall be the following:
1. SDR 21, PVC, pressure-rated pipe; Schedule 40, PVC socket fittings; and solvent-cemented joints.
- F. Circuit piping, NPS 2-1/2 to NPS 4, shall be the following:
1. SDR 21, PVC, pressure-rated pipe; Schedule 40, PVC socket fittings; and solvent-cemented joints.

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- G. Underground Branches and Offsets at Sprinklers and Devices: Schedule 80, PVC pipe; threaded PVC fittings; and threaded joints.
 - 1. Option: Plastic swing-joint assemblies, with offsets for flexible joints, manufactured for this application.
- H. Risers to Aboveground Sprinklers and Specialties: Schedule 80, PVC pipe and socket fittings; and solvent-cemented joints.
- I. Drain piping shall be one of the following:
 - 1. SDR 9, 11.5, or 15, PE, controlled ID pipe; insert fittings for PE pipe; and banded or fastener joints.
 - 2. Schedule 40, PVC pipe and socket fittings; and solvent-cemented joints.
 - 3. SDR 21, 26, or 32.5, PVC, pressure-rated pipe; Schedule 40, PVC socket fittings; and solvent-cemented joints.

3.11 VALVE SCHEDULE

- A. Underground, Shutoff-Duty Valves: Use the following:
 - 1. NPS 2 and Smaller: Curb valve, curb-valve casing, and shutoff rod.
- B. Aboveground, Shutoff-Duty Valves:
 - 1. NPS 2 and Smaller: Bronze ball valve.
 - 2. NPS 2-1/2 and Larger: Iron ball valve.
- C. Throttling-Duty Valves:
 - 1. NPS 2 and Smaller: Plastic automatic control valve.
 - 2. NPS 2-1/2 and NPS 3: Plastic automatic control valve.
 - 3. NPS 2-1/2 and NPS 3: Iron ball valve.
- D. Drain Valves:
 - 1. NPS 1/2 and NPS 3/4: Automatic drain valve.
 - 2. NPS 1/2 and NPS 3/4: Plastic ball valve.
 - 3. NPS 1 to NPS 2: Plastic ball valve.

END OF SECTION 328400